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external table than at the internal table so the square of bone removed would have been wedge shaped. I was told some skulls had as many as five trepanations, sutures were not avoided so the dangers of injuring a cranial sinus must have been known. Another skull had an irregular oval foramen. A third had two foramina, one frontal, one parietal. The frontal foramen was closed with a burnished gold plate sealed in with a brownish substance. I was told that was done pre-mortem but the gold was so burnished and fitted in with the contour of the skull to such perfection that I doubt the truth of that. I also saw a skull from which all the teeth had been removed and replaced crudely and non-anatomically with amethyst spikes. Mastication would have been impossible. That proves decoration after death did occur.

In Peru I was told the operation was limited to males aged between 15 and 35 who had proven themselves in battle. That would justify my personal conclusion it was an initiation ritual analogous to tattooing in the Maori and circumcision in Transkei, both which have philatelic representation (4), (5).

Olaf believed operation was to relieve what ever had been forced out of blood vessels or to lift up and remove something forced in by external forces. The theory that trepanning was to allow the relief of tension is not compatible with the fact it was restricted in Peru to heroes.

Amulets and necklaces have been found made of pierced rondelles and it is possible the operation was done to obtain these but more likely in my view the rondelles had a magical value transferring the courage and strength of the victim to the wearer. It is also believed bone dust collected during operation had a magical therapeutic value.

One question is how was pain withstood. Both the Aymaras of Bolivia and the Quechua of Peru commonly chewed erythroxylon coca, which contains the alkaloid cocaine. It is possible that such leaves were used as an anesthetic. The Inca surgeon reputedly chewed coca leaf and drooled saliva into the wound. This may have had some local anaesthetic effect. I doubt if such saliva has any antiseptic action.

A question is how was infection avoided. In South America embalming was

known. Peru balsam which contains cinnamic and benzoic acids, both mild antiseptics, and menthol, sodium chloride, saponins, alkaloids and resins were used for this purpose. Possibly such substances were used as dressings.

Skulls were trephined post-mortem for several reasons. Some with multiple foramina were suspended with a cord, and used or worn as an ornament, or as an act of contempt for the dead. That might evidence the courage of the wearer. Skulls with very large foramina may have been used as drinking cups.

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#### STEPHEN H. SMITH (1881-1951)

Adolf Schwartz, Bakersfield, CA

He was born in Shillong, Assam, India of Anglo-Indian heritage on Feb. 14, 1891. After graduating from St. Patrick High School in Asansol (1911) he entered the Calcutta Customs and Police School. Within the available school system he joined the Calcutta College of Dentistry and Surgery and graduated as a dentist.

The years 1914-18 he served in the Medical Corps of the Indian Army as a dentist. After leaving the military service he operated a dental office in 25 Elliot Road, Calcutta. Always interested in physics Dr Smith devoted particular attention to rockets and the possibility of using rockets to forward mail. Sponsored by Sir David Ezra, a millionaire business man from Calcutta, Dr Smith successfully dispatched on June 28, 1935 a rocket containing a hen and a cock and a number of letters across the river Damodar, near the modern Baruipur. Later his efforts were supported by Sir Tashi Namgyal, the Maharaja of Sikkim. The rockets were manufactured by the Orient Fireworks Co. of Calcutta. After having fired some 25 rockets Dr Smith began to manufacture the rockets himself. He signed all covers, letters and

postcards which he forwarded and a Jal Cooper catalogue exists which gives details of Stephen Smith's rocket experiments and the mail forwarded. Dr Smith also published 4 books about his experiments.

He died in Calcutta on February 15, 1951, aged only 60 years.

#### NEW ISSUES

Steven J. Schweon. 125 Red Haven Drive, North Wales, Pa. 19454

- Belgium: (11/14/94) Hearing-impaired person.  
Brazil: (2/19/95) Louis Pasteur.  
Brunei: (12/30/94) Drug Abuse.  
Columbia: (1994) Natl. Institute of Medical, Law & Forensic Sciences.  
Ghana: (12/20/94) Red Cross.  
Guyana: (2/95) Disney characters as health care workers.  
Japan: (11/4/94) Diabetes Federation. (3/3/95) Modern Anatomical Education.  
India: (10/30/94) Cancer Congress.  
Kenya: (12/22/94) Health.  
Liechtenstein: (3/6/95) Red Cross.  
Mali: (4/7/94) Vaccination against measles. (1994) Campaign against illegal drugs.  
Mozambique: Drug Abuse.  
New Caledonia: (2/14/95) Louis Pasteur.  
Norway: (2/23/95) Pharmacy.  
Pakistan: (10/18/94) Medicinal Plants of Pakistan.  
Paraguay: (11/25/94) Red Cross.  
Philippines: (1994) AIDS.  
St. Helena: (2/2/95) Emergency Services.  
Taiwan: (1995) National Health Insurance. (6/1/95) Anti-drug campaign.  
Thailand: (3/31/95) Red Cross.  
Uruguay: (1994) Red Cross.

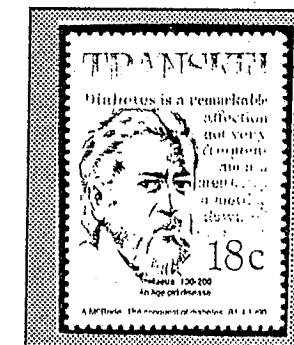
#### DIABETES THROUGH THE EYES OF PHILATELY

Dr. D MATHALE MB BS DCH DPM

This fascinating condition is characterized by polyuria (excessive passing of water), polydipsia (excessive thirst), hyperglycemia (excessive level of glucose in the blood), glycosuria (excessive glucose content in urine), loss of weight, coma, and death.

The existence of diabetes dates back to the ORIGIN OF MANKIND (KENYA 1982).

Diabetes has been known to mankind from early CIVILIZATIONS - (2) EGYPT 1988 - and has been recognized through the ages by the PHYSICIANS OF THAT TIME - (3) TRANSKEI FDC 1990.

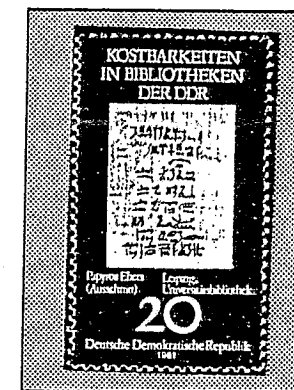


Areteaus

It was ARETEAUS of Cappadocia (130-200 AD) - (4) TRANSKEI 1990 - who gave the name to DIABETES - 'the passer through', as he called it. The word diabetes signifies 'siphon' and was used because

'for fluids do not remain in the body but use the body only as a channel through which they may flow out'. This disease, 'rather rare, consisted in a liquefaction of the flesh and bone into urine. No matter what quantity of fluid the patient drinks, satisfaction never occurs - he cannot be stopped from drinking or from urinating. Life lasts only for a time, but not very long.' Although Areteaus was a frank copyist, he showed originality in his chemical description, and his work is well worth reading even today. It reveals a true disciple of Hippocrates, the bedside observer, disdainful of theory and above all eager to be of assistance to the patient. (1)

The illustration is of a page from a medical Papyrus (5) EAST GERMANY 1981 - which was copied from a much older book and is a series of recipes for named disease. There, we find various remedies suggested to control a too-copious-flow-of-urine-condition suggestive of diabetes. Ancient Egyptian physicians were thought to be responsible for these manuscripts. Most are medical except the Edwin Smith papyrus which is essentially surgical.



Ebers Papyrus

Amongst the most famed Egyptian physicians was THOTH - (6) EGYPT 1925 - means 'he who gives physicians skills to cure', the patron deity of physicians. Greeks later identified him with HERMES - (7) GREECE 1911. Another Egyptian medical deity - HORUS, son of Isis (4000 BC) - (8) EGYPT 1979 lost his eye in a fight with a demon. Seth I was God of Health and restored Horus' sight later miraculously. The origin of the symbol R is said to be the eye of Horus and is associated with danger, chariots and description.

Around 2780 BC, a very important figure can be recognized - IMHOTEP (9) EGYPT 1968 and 1981. His name means 'he who cometh with peace'. Osler states that Imhotep was the first true figure of physician to emerge in antiquity. He was a Grand Vizier of KING ZOSER - (10) EGYPT 1987 - and a brilliant architect who built the PYRAMID OF SAQQARA - (11) EGYPT 1987. The Greeks equated Imhotep with ASCLAPIUS - (12) SPAIN 1948. (III)

Although the word diabetes only appeared after Areteaus, the symptoms of this condition have been mentioned by various ancient Graecoroman physicians. HIPPOCRATES (460-370 BC) - (13) SYRIA 1965 - Father of Medicine, who gave physicians their oath, wrote about watery urine and mentioned delayed or no recovery of the patient with excessive watery urine. ARISTOTLE (384-322BC) - (14) GREECE 1978 - teacher of Alexander, emphasized that there were four primary and opposite fundamental qualities, hot and cold, dry and wet, and four elements, earth, wind, fire and rain. In his treatise on Historia Animalium, he wrote about animals making excessive urine. (III)

Between 1500 BC and the first century AD, HINDU MEDICINE - (15) NEPAL 1977 - evolved significantly. The Aryan medical traditions were codified in Sanskrit. The Ayurveda has mentioned conditions in detail which seem like diabetes. Charaka and Sushruta, noted Hindu



Dhanwantari

physicians, described diabetes. Prameh means diseased flow of urine, more specifically Ikshumeha means sweet or sugary urine, and Madhumeha means honey urine. (Such descriptions did not appear in Western literature until the 17th century.) The Vedas also mentioned congenital sugary urine and one which comes later in life. (I)

The most important source for early Chinese medicine is 'Huang Ti nei Ching su wein', the YELLOW EMPEROR's classic of internal medicine - 269OBC(16) CHINA 1983 - is the summarized work of some books of actual medical practice under the categories of diagnosis, prognosis, therapy and regimens, covering all aspects of body function with the information organized for the medical purpose.

Diabetes has been described in detail in this classic of internal medicine. (I)

In the early era of Islamic medicine, many Islamic medical pioneers have mentioned symptoms of diabetes. Though not an Arab, CLAUDIUS GALEN (130-201AD) - (17) YEMEN 1986 - a Roman Greek, was considered by the Arabs to be the Prince of Physicians. He made many great discoveries and also many false assumptions. He thought it was a diseased kidney which could not hold back water and urine was nothing but unchanged drink. His work and teaching remained unchanged over a thousand years.

About 865-925AD, ABU BAKR IBN ZAKARIYA AL RAZI (18) IRAN 1964 - introduced chemistry in the treatment of disease. He wrote over 200 books and discussed diabetes. It was AVICENNA (980-1037AD) - (19) POLAND 1980 - Abu Ali el Hussein Ibn Abdullah Ibn Sina - the great Arab physician whose works were widely known in Europe, who might have introduced the idea of sweet urine to the Western world. (I) He also noted the relationship between gangrene and diabetes. In his classic book - the Canon - he describes diabetic urine as 'heavy' and 'dried quickly' leaving a sweet residue.

Amongst all the early Jewish physicians, one name stands out - Abu Imran Musa ben Maimon Ibn Abd Allah - MOSES MAIMONIDES (1135-1204AD) - (20) SPAIN 1967 - who wrote over 1500 treatises which included urine analysis and diabetes.



Paracelsus

During the 16th century, a Swiss physician and chemist named PARACELSUS - Phillipus Aureolus Theophrastus Bombastus von Hohenheim (1493-1541AD) - (21) AUSTRIA 1991 - knew Avicenna's work very well and emphasized testing urine several times and mentioned its sweetness. He used an iatrochemical approach to describe the disease as caused by 'dry salt ... lasting permanent and fixed'. He also described various symptoms, i.e., vast quantity of yellow acid urine, swelling of feet, rapid pulse, and pains in the thigh.

In Europe, progress during the 17th and 18th centuries was continued by scientists like JEAN BAPTISTA VON HELMONT (1577-1644) - (22) BELGIUM 1942 - Belgian physician and chemist and a follower of PARACELSUS. The founder of the iatrochemical school and the inventor of the term GAS, he thought diabetes was a blood disease. (II)



Van Helmont

HERMANN BOERHAAVE (1668-1738) - (23) NETHERLAND 1937 - foremost physician and clinician of all time, he believed sugar was present in the blood of a diabetic and that was the reason it appeared in urine. He was the first to obtain urea and discovered its diuretic property. He opposed the iatrochemical school and its approach, but used hydraulic and mechanical principle although it failed him as an explanation for specific secretion of other glands. (II) A Dutch physician, FRANCISCUS DE LA BOE SYLVIUS (1614-1672AD) (24) NETHERLAND 1937 - was born in Germany and became Professor of Leiden University. He was a great teacher and accomplished in anatomy and medical chemistry. He believed Acids and Alkalis are

fundamental constituents in the animal body. He believed pancreatic juice was acid and appeared with alkaline gall in the duodenum, and the combined ferments went to the heart. This idea induced Regnier De Graaf (of Holland) to obtain pancreatic juice from a dog by means of a fistula. (II)

THOMAS WILLIS (1621-1675) who was the first European who equivocally stated that diabetic urine is wonderfully sweet and added the name Mellitus' (honey sweet) to the word diabetes. (I)



Thenard

About two hundred years later, a French chemist, LOUIS JACQUES THENARD (1777-1857) - (32) FRANCE

1957 - a knight, baron, commander and chancellor of the University of France, whose greatest single discovery was of hydrogen peroxide, obtained sweet granules after evaporating diabetic urine which he noted behaved like sugar when treated with alcohol. His early collaboration with another French chemist, GUY LUSSAC (1778-1850) - (33) FRANCE 1951 - was on sugar fermentation. Both were on the panel of investigating commission for Eugene Peligat's work on diabetic sugar. The commission proposed the name 'glucosel'. (II)

It took the last 200 years to understand diabetes by the various physicians who worked on two main branches of medicine - digestive system and neurophysiology. During the 18th century, progress in relation to the digestive system began with VICTOR ALBRECHT VON HALLER (1708-1777) - (25) SWITZERLAND 1934 - an eminent Swiss physician, anatomist, chemist and botanist whose recognition of mechanical automatism of the heart has been celebrated as one of his most important works. Along with work on neurology, lungs and diaphragm, his work on the digestive system has earned him a place amongst the great pioneers.

Nothing further happened to advance the understanding of diabetes until later in the

19th century. LOUIS PASTEUR (1822-1893) - (26) MONACO 1972 - a great French chemist whose momentous discovery in fermentation and sugar metabolism was as important as many of his other discoveries, e.g., disease of the silkworm, anthrax, cholera, and rabies.

However, it was another Frenchman, CLAUDE BERNARD (1813-1878) - (27) TRANSKEI 1990 - who made the startling discovery about absorption of fat and function of the pancreas in 1848. The presence of sugar in blood under fasting condition, and physical presence of sugar in the liver which led to the theory of 'glycogenic function of liver'. Along with his famous 'cellular theory', his work on gastric and pancreatic juice and the effect of the sympathetic nervous system on digestion and glucose, and discovery of glycogen, has earned him the title 'The Father of Experimental Physiology. (II)

Meanwhile, important work as regards the nervous system and glucose metabolism was carried out by the most prominent German physician and brilliant pathologist of the 19th century - RUDOLF CARL VIRCHOW (1821-1902) - (28) WEST BERLIN 1952. During his long and successful career, he worked on the digestive system and pancreatic function.

In 1877, he established 'cellular pathology' stating life is merely the sum of physical and chemical action and essentially the expression of cell activity.

PAUL LANGERHANS, Virchow's pupil and close friend in later days, working in Virchow's laboratory, who produced the

first complete detailed microscopic study on the pancreas and discovered cell islets of

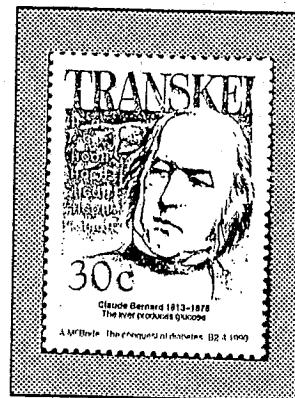
pancreas in 1869. The name given after him by a French histologist in 1883 'les islets de Langerhans'. Its insulin secreting property was established later.

In 1889, an accidental discovery led to the path. OSKAR MINKOWSKI (1858-1931) - (29) TRANSKEI 1990 - born in Lithuania who later became Professor Extraordinaire and Director of the Academy of Cologne, and his associate, JOSEPH VON MEHRING explored the necessity of the pancreas for survival in dogs. After excising the pancreas, Minkowski found that the dog could live but developed diabetes, and also that the dog was unable to digest protein and fat. This discovery led to the realization that malfunction of the pancreas causes diabetes. (VI, I)

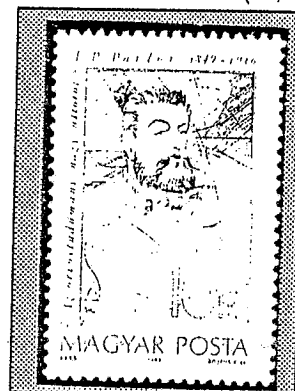
The effect of the nervous system on digestive function and glucose metabolism was investigated by the great Russian physiologist, IVAN PAVLOVICH PAVLOV (1849-1936) - (30) HUNGARY 1989. He received the Nobel Prize in 1904 for his research on

digestion during the period 1879 and 1897. He created various fistulas from the salivary gland and stomach and pancreas to the body surface. He studied the effect of conditioned reflex on digestive organs in 1903. A distinguished scientific administrator, in 1977 he established the Russian Physiological Society, now known as I P Pavlov All Union Physiological Society. (II)

During 1920-30, an Argentine an physician, biologist and physiologist, BERNARD ALBERTO HOUSAY (1887-1971) -



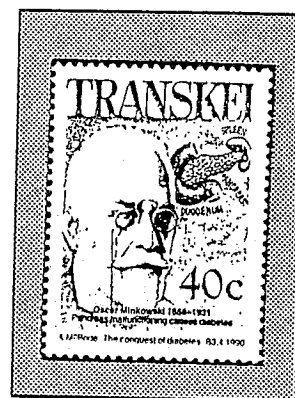
Bernard



Pavlov



Houssay



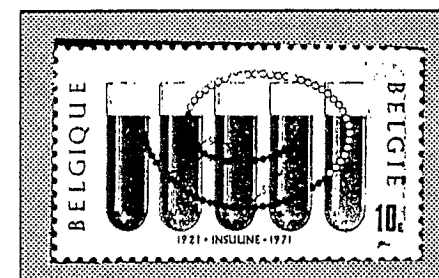
Minkowski

(31) ARGENTINA 1976 - worked on the pituitary gland. His discovery of hormones produced by the anterior lobe of the pituitary gland and their function earned him the Nobel Prize in 1947 - the first South American doctor to be so honored. He showed that these hormones are essential for the proper utilization of carbohydrate and metabolism. Houssay showed that if both the pancreas and the pituitary gland were removed, most diabetic symptoms did not appear.

During the late 19th century, an Austrian chemist, JOHANN FLORIAN HELLER (1813-1871) (34) AUSTRIA 1981 - worked on urinary composition. He introduced

the nitric acid ring test for urine albumin, and caustic potash test for sugar in urine. In the early 20th century, a second year student at the University of Cincinnati introduced the copper sulphate solution test for urine sugar, whilst and published 9 original papers on the chemistry of urine. The test, known as Benedict Test, - (35) BELGIUM 1971 - was named after STANLEY ROSSITER BENEDICT (1884-1936). He later became a Professor of Chemical Pathology at Cornell University Medical College, New York, The test is still being used in many parts the world. (VI)

A Stamp of - (36) CANADA 1971 - illustrating LABORATORY SCIENCE at the time of the discovery of insulin, shows the apparatus used for 'BLOOD GLUCOSE' ESTIMATION. Today, the modern



Benedict's Test



Blood Glucose Estimation

blood glucose testing machine - (37) ST VINCENT 1984 - gives a quick and accurate blood glucose level using a drop of blood from a finger prick.

Although Minkowski's work associated diabetes with the pancreas, nearly thirty more years passed before the nature of this association was explained and put to use for diabetic control. The discovery of insulin and its purification took place in the physiological laboratory of DR J R MCLEOD at the University of Toronto. The discoverers, SIR FREDRICK GRANT BANTING and HERBERT BEST - (38) KUWAIT 1971 - had been given the assignment to discover a method for making pancreas extract which would be effective and safe. In 1921 they had obtained the necessary active extract, but when used in 1922, toxic reaction occurred. JAMES B COLLIP, a talented biochemist, used 95% alcohol solution for extraction and solved the problem. The first successful use of insulin was in January 1922. Following this, McLeod and Banting received the Nobel Prize in 1923, which they shared with Collip and Best respectively. Thus, control over diabetes became a reality. (I)

In 1925, JOHN JACOB ABEL (1857-1938) - an American chemist - succeeded in obtaining 'CRYSTALS OF INSULIN' - (39) DENMARK 1990. His work on insulin, and that of his students, played an important part in Frederic Sanger's identification of the complete primary structure of insulin in 1955. (II) Sanger (1918- ) an English biochemist who spent 10 years elucidating the structure of bovine insulin molecules, finally determined the exact orders of all the molecules of amino acid essential for the laboratory synthesis of insulin. He received the Nobel Prize in 1958 and again in 1980 for his work in determining the sequence of nucleotide in DNA MOLECULE (40) ISRAEL 1988. (V).



Banting &amp; Best

Diabetes affects most organs of the body. Poor control of diabetes leads to its complications. Its major complications are depicted on the following stamps - AMPUTATION (vascular), NEPHROPATHY, CARDIAC INVOLVEMENT, - (41), (42), (43) DOMINICAN REPUBLIC 1974 and RETINOPATHY - (44) AUSTRIA 1979.

Philatelic material has been in use for public awareness, education and publicity. Diabetes is no exception, one just has to see (44) Australia's stamped envelope of 1971 showing the relationship between blood sugar and insulin and pancreas, or (45) St Vincent's stamp of 1989 showing the treatment and control of diabetes. Insulin and diabetes have been depicted in the form of SPECIAL CANCELLATIONS by many countries, e.g. (47) Great Britain 1971.

No. Subject Country Year

- |                          |                   |
|--------------------------|-------------------|
| 1 ORIGIN OF MANKIND      | Kenya 1982        |
| 2 CIVILIZATION           | Egypt 1988        |
| 3 PHYSICIANS OF THE TIME |                   |
| 4 ARTEAUS                | Transkei FDC 1990 |
| 5 EBERS PAPYRUS          | Transkei 1990     |
| 1981                     | East Germany      |
| 6 THOTH                  |                   |
| 7 HERMES                 | Egypt 1925        |
| 8 HORUS & ISIS           | Greece 1911       |
| 9 IMHOTEP                | Egypt 1979        |
| 1981                     | Egypt 1968 &      |
| 10 KING ZOSER            | Egypt 1987        |
| 11 PYRAMID OF SAKKARA    | Egypt 1987        |
| 12 ASCLAPIUS             | Spain 1948        |
| 13 HIPPOCRATES           | Syria 1965        |
| 14 ARISTOTLE             | Greece 1978       |
| 15 HINDU MEDICINE        | Nepal 1977        |
| 16 YELLOW EMPEROR        | China 1983        |
| 17 CLAUDIUS GALEN        | Yemen 1986        |
| 18 AL RAZI               | Iran 1964         |
| 19 AVICENNA              | Poland 1980       |
| 20 MAIMONIDES            | Spain 1967        |
| 21 PARACELSUS            | Austria 1991      |
| 22 HELMONT               | Belgium 1942      |
| 23 HERMANN BOERHAAVE     | Netherlands 1937  |
| 24 F D L SYLVIVS         | Netherlands 1937  |
| 25 A VON HALLER          | Switzerland 1934  |
| 26 LOUIS PASTEUR         | Monaco 1972       |
| 27 CLAUDE BERNARD        | Transkei 1990     |
| 28 RUDOLF VIRCHOW        | West Berlin 1952  |
| 29 OSKAR MINKOWSKI       | Transkei 1990     |

- |                             |                 |
|-----------------------------|-----------------|
| 30 I P PAVLOV               | Hungary 1989    |
| 31 HOUSSAY                  | Argentina 1976  |
| 32 L J THENARD              | France 1957     |
| 33 GUY LUSSAC               | France 1951     |
| 34 J F HELLER               | Austria 1981    |
| 35 BENEDICT                 | Belgium 1971    |
| 36 INSULIN LABORATORY       | Canada 1971     |
| 37 BLOOD GLUCOSE ESTIMATION |                 |
| St. Vincent 1984            |                 |
| 38 BANTING AND BEST         | Kuwait 1971     |
| 39 INSULIN CRYSTAL          | Denmark 1990    |
| 40 DNA MOLECULE             | Israel 1988     |
| 41 AMPUTATION               | Dominican       |
| Republic 1974               |                 |
| 42 NEPHROPATHY              | Dominican       |
| Republic 1974               |                 |
| 43 CARDIAC INVOLVEMENT      | Dominican       |
| Republic 1974               |                 |
| 44 RETINOPATHY              | Austria 1979    |
| 45 STAMPED ENVELOPE         | Australia 1971  |
| 46 DIABETES CONTROL         | St Vincent 1989 |
| 47 SLOGAN POSTMARK          | Great Britain   |
| 1971                        |                 |

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#### MEDICAL BOTANY

Professor Teoman Onat, Istanbul, Turkey.  
(Continued from previous issue)

8:26

#### Ficus thonningii Blume

It belongs to the Moraceae family. The root stimulates lactation (*galactagogue*). The fruit is edible and is used in beer-making. The powdered bark is used on wounds and a decoction for colds and throat infection.



8:26

#### Lantana Camara L. (Tick berry ; ağaç mines)

This ornamental plant which generally grows in S. Africa belongs to the Verbanaceae family. In W. Africa the leaf is used for cough and colds, also as diaphoretic as well as in a bath for rheumatism. Leaf extracts have shown antibiotic activity against certain bacteria. Children became ill by eating the fruit. In Australia it is cattle poison. The leaf contains an icterogenic principle: lantanin which produces photosensitization in the sheep. Also called lantanede A, a gamma lactone with a phenanthrene nucleus, produces severe icterus in the sheep if 2 g is ingested. The plant has given neg. tests for HCN. The flower contains an anthocyanin and carotene. The bark and rind contains tannin.

